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MRS-400

User manual

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1 Introduction

1.1 Document Scope

This document describes the operation of the MRS system.

1.2 Terminology

	Term	*Description*

2. GENERAL

2.1 Introduction

PCH MRS System is a multimedia streaming from the field and monitoring system. It allows streaming vido/audio/location over cellular network and monitoring everywhere on the network. The streaming media is done using MRS units which can be located everywhere on mobile vehicles or fix locations. Monitoring is capable on fix/mobile control centre, mobile phones/PDA and internet web client.

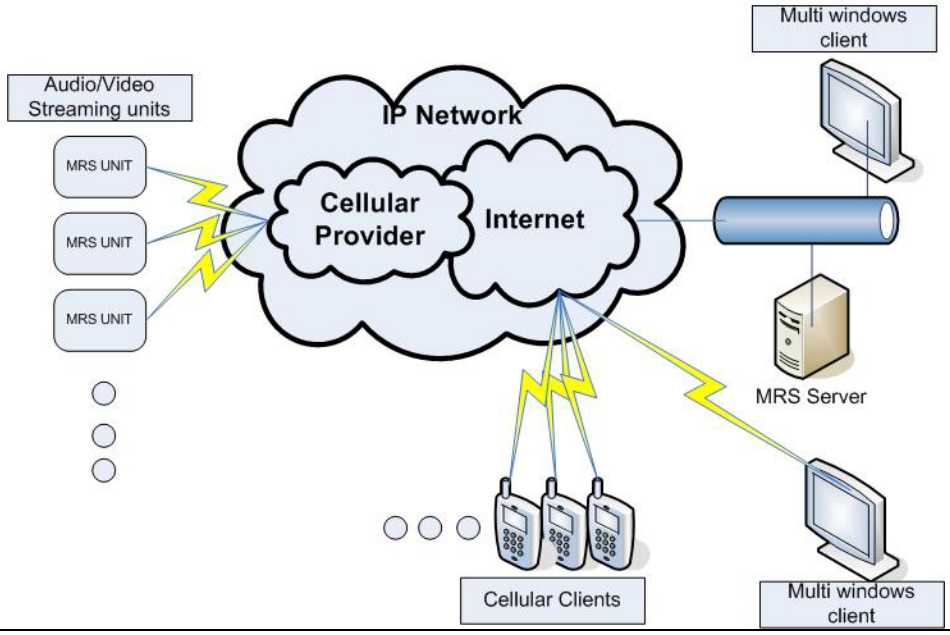
2.2 Pre-Installation

The control centre server can be installed on any PC with XP and newer. **Fix IP address** must be installed for the SERVER (like any web site), so the units have IP address as their destination. If there is a firewall in the server 2 ports must be open:
12654 TCP
12655 UDP

2.3 System Architecture

The system has 2 major architectures:

1	M2M architecture (recommended), which based on a server with fix IP address. Multiple units can communicate with the server as well as multiple clients. All clients are connected to the server only.
2	P2P Architecture, which the server is running inside the unit. IP address of the unit must be global and fixed to be reached from outside. This global IP must be provided by the cellular provider.

	The system consists from the following components:	
	1	**MRS units** which can stream up to 4 channels of video, 1 audio channel and GPS location over cellular to MRS server
	2	**MRS Server** communicates with units and clients.
	3	**MRS Client** communicates with server and has viewing and control capabilities of all connected units.
		
		Figure 1 - MRS -System Architecture

3. Component description

3.1 MRS Unit

	The MRS unit is based on embedded hardware/software with built-in cellular network interfaces. The unit must be configured in order to work properly. The IP address of the server must be set into the unit, parameters of the cellular provider (like APN) and options specific to the unit. There are two ways to configure the unit:	
	●	Input parameters are set using USB cable to a PC (**recommended**)
	●	Built-In LCD and built-in function-keys.

3.1.1 Unit Configuration

	Make sure the SIM or the SD cards are not inserts. Once the USB cable is connected to a PC with (XP or higher) new hardware is detected in the PC asking for driver. Point to the driver attached on the CD and Install the driver. After driver installation is completed, install the **Device Config** Setup application, which allow you to configure the unit through the USB cable. This application communicates with the unit and has a menu with the following options:
	● **Device Identification** – Let you update the device name and ID
	● **Connection** – Let you update the server IP, provider APN etc.
	● **Recording** – Let you setup the size file limit.
	● **GPS** – Let you enable/disable the GPS capability
	● **Upgrade** – Let you upgrade the unit framework.
	● **Log** – Let you log information while running.
	After changing the necessary information using device config application, the information must be burned into the unit. This is done by using the burning key (candle light key/write to device) After pressing this key the status down the application show: "parameters saved" Usually you need to change the IP address and the APN (Access Point Name of the cellular provider) only (inside connection menu) .

Figure 2 – MRS Unit

3.2 Hardware Interfaces

3.2.1 Video

	Video has 4 BNC connectors for input. Make sure to connect the camera(s) to the BNC input

3.2.1 Audio

Line in and Line out

3.2.2 GSM Antenna

	GSM antenna has SMA interface near the BNC. Make sure to connect the GSM antenna to the SMA GSM connector

3.2.3 GPS Antenna

	GPS antenna has SMA interface near the BNC Make sure to connect the GPS antenna to the SMA GPS connector

3.2.4 PTZ

	PTZ has 2 RS-485 output lines coming from terminal block (T+, T-), the baud rate is 2400 BPS, id=1 and PELCO D protocol

3.2.5 I/O	
	There are 4 input and 4 output dry contact, In order to close the input circut you must connect between GND line and one of the inputs. The same with the output (max 5v)
3.2.6 USB Client	
	USB client is used for device setup using **device config** application
3.2.7 USB Host	
	USB host is used for external modems, disk on key, USB2LAN adapter etc.
3.2.6 LCD	
	LCD purpose is for viewing device status, viewing video channel

3.3 MRS Server

The MRS SERVER supports multiple units and clients. One and only one MRS SERVER must be running in MRS system. The MRS server software is universal and can be configured to run as part of MRS client or MRS unit. The MRS Server purpose is to communicate with all MRS units and clients and to stream video/audio/location from units to clients.

The MRS software is called "**monitor**"

The system is using 2 ports in the monitor server side:
12654- TCP
12655- UDP

These ports must be open in the monitor server side in order to let units and client to connect to the server and stream video.

In order to let the MRS application to remember the setting as IP, open **session** menu and **automatic**

In order to setup the MRS to act as server, open the session menu, connections and check the local server item. Once the server is running (status bar (down the window) shows "server is listening", units can run and communicate with the server.

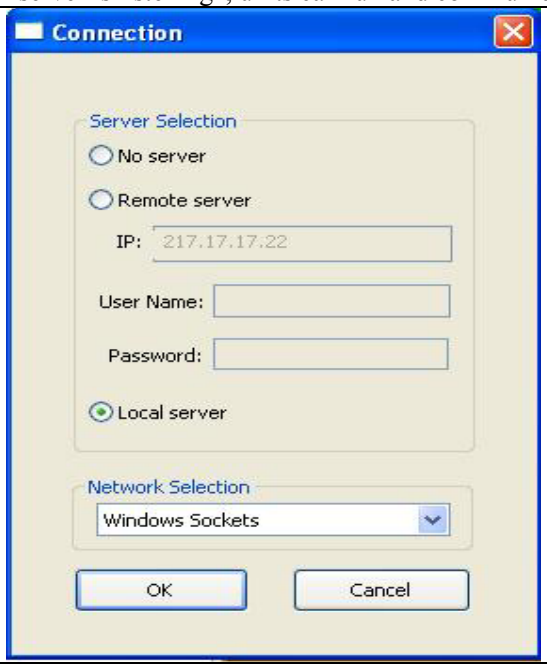
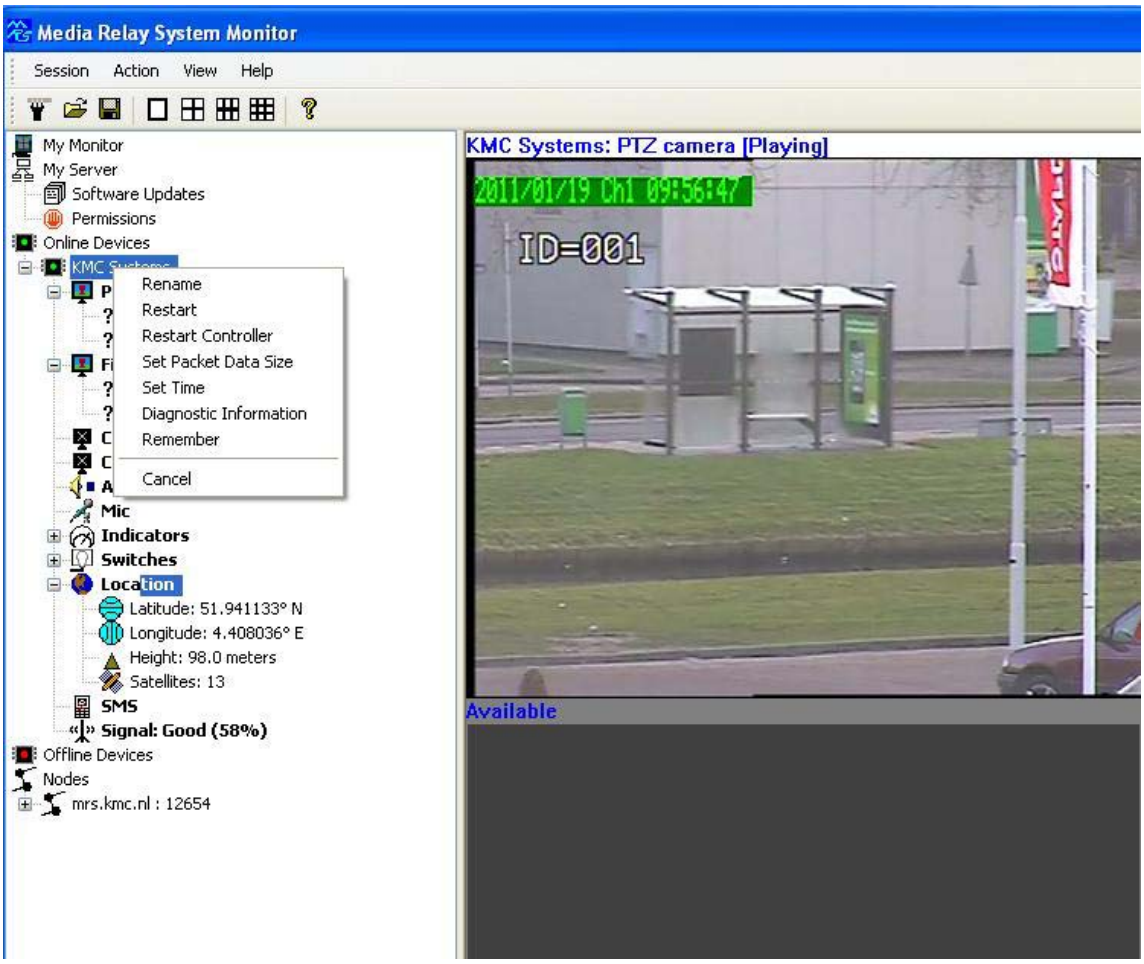


Figure 3 – MRS Monitor - Local Server setup

	In order to setup the MRS to act as client, open the **session** menu, connections and check the **remote server** item with the server IP address. It is possible to use DNS name instead
	Figure 4 – MRS Monitor - Client setup

3.3.1 Device properties

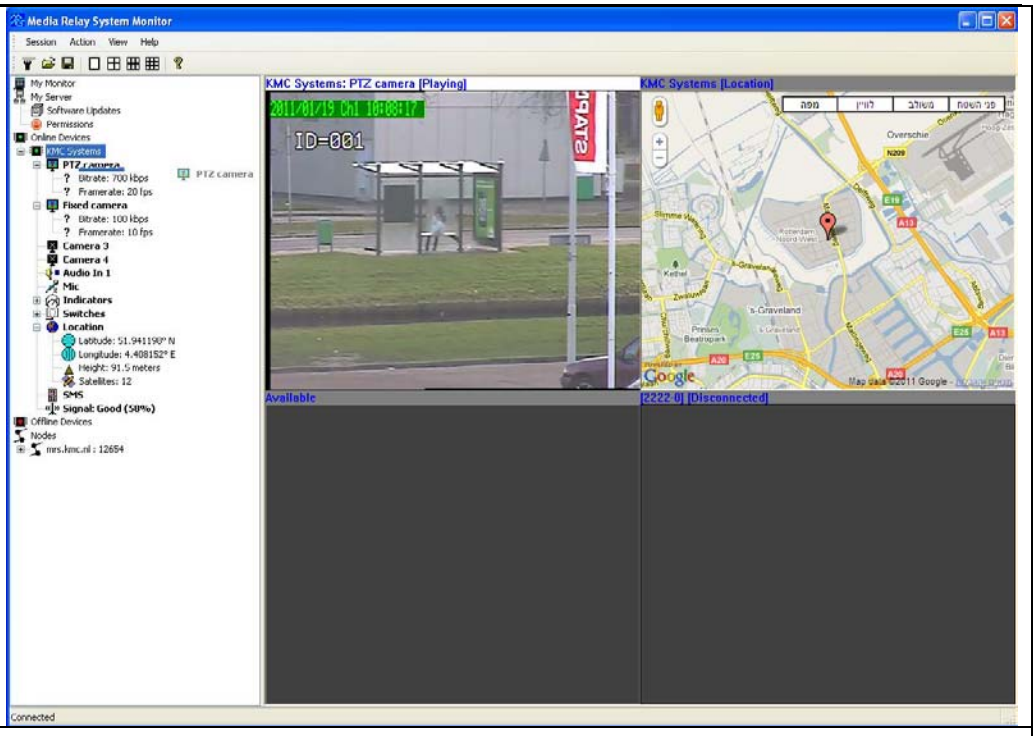


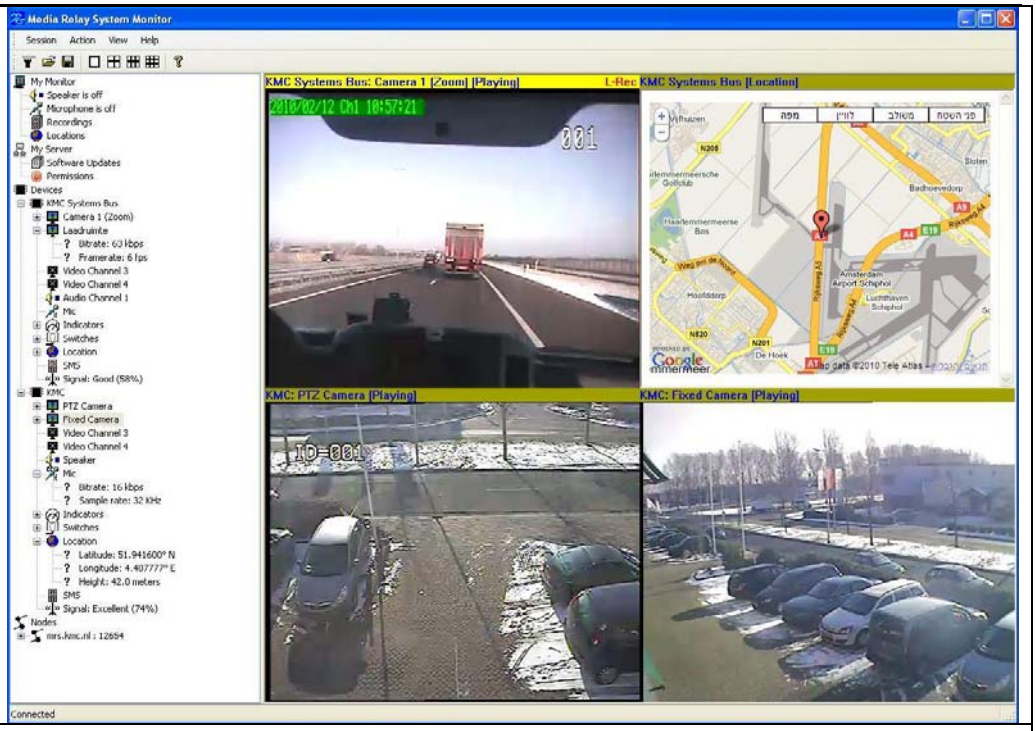
3.3.1.1 Device control parameters

User can change and control the device from the monitor:
Device name- Rename
Restart the device
Restart the video controller
Set packet size – Default is 1000 (better not to change this parameter)
Set time of the device
Remember- this parameter can be checked in order to move the unit to the offline devices list in case the unit is disconnected

3.3.2 Viewing video

3.3.2.1	**Viewing video through device tree**
	Before viewing channel must be **enable.** In order to enable specific channel put the cursor over the channel and right click / or use action menu then check the **enable** item

	
	Figure 5– MRS Monitor – Enable video channel
	Once the MRS unit is connected, a new tree with the specified unit name appeared on the left side of the application window. The tree expresses exactly the unit features as defined inside the unit. Channels are viewed in the tree with their names and current bit rate and frame rate. Indicators and output signals are viewed with their current status. If the unit has a PTZ camera (connected to camera port 1) connected, PTZ control will be open to support the camera. **Drag&Drop** the **channel** to the desired window opens that channel for streaming. Double click on open picture resize the picture to full screen; double clicking again return to the previous setting.

	
	Figure 6 – MRS Monitor - 4 channels video window.
	Viewing area can be split to 1, 4, 9 and 16 viewing channels. The device name, channel name and other parameters as bit rate, frame rate can be changed by putting the cursor on specify channel and pressing F3 or through the action menu (while cursor on the specific channel).

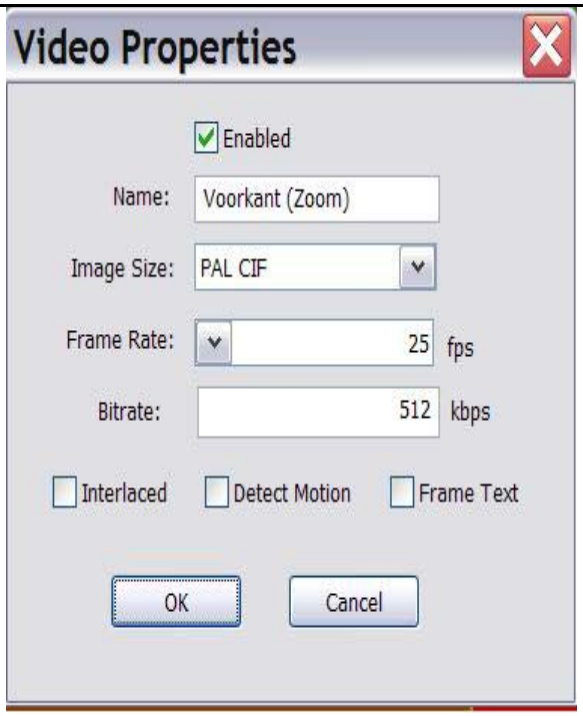


Figure 7 – MRS Monitor – Channel video properties

Right clicking on the viewing window opens small menu with the same options.

The most important parameters when viewing the video are **bit rate** and **frame rate**. The bit rate is based on the bandwidth supported by the mobile network in the area of using, and the bit rate of all viewing channels must be less then the bandwidth. For example, if viewing only 1 channel and the bandwidth is 200kb then the bit rate must be less or equal to 200kb. Frame rate can be any number from 1 to 25/30 but in low bandwidth as 200kb 10 to 15 is preferred.

3.3.2 Device location (GPS)

The MRS unit has a built-in GPS location function which transmitted to any connected client. In order to allow GPS capability you need to check it in the configuration software of the unit.
There are 2 options to view devices on the map

1. **system level** - all connected devices over specified map
2. **device level** - for specific device only

click on any device icon will let you open floating window for live streaming

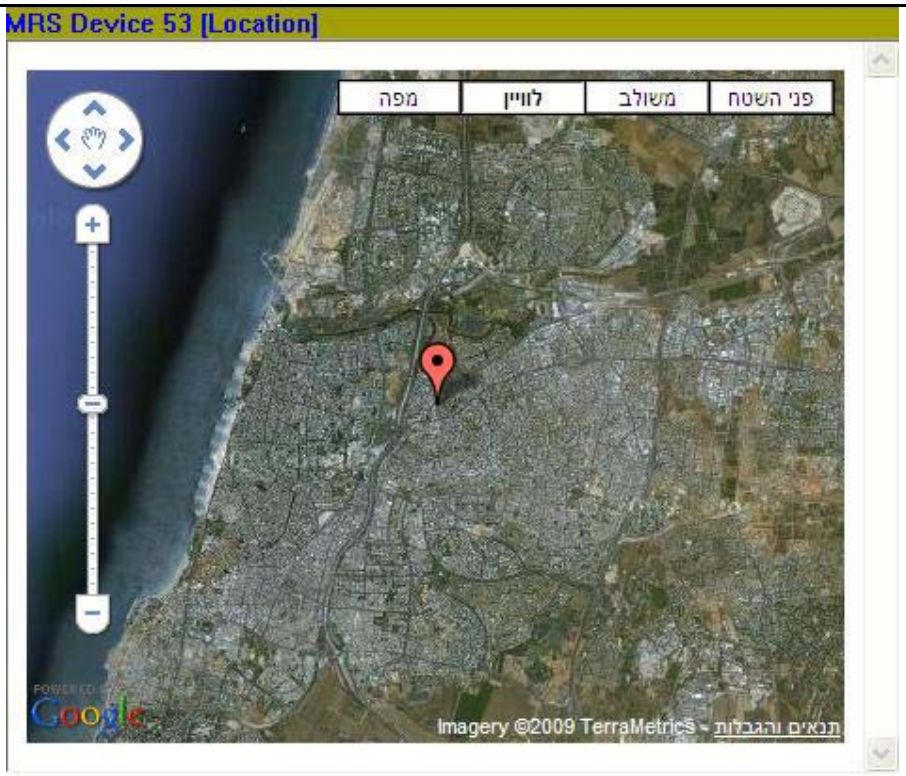


Figure 8 – MRS Monitor – Device location

3.3.2.1 System level map

System level (under system tree) which you can see all devices on one map moving as icons,. If there are more then one device icons on the map, the map is not centered.

3.3.2.2 Device level map

Device level (under specific device tree), in this case the device icon is centered automatically every few seconds.

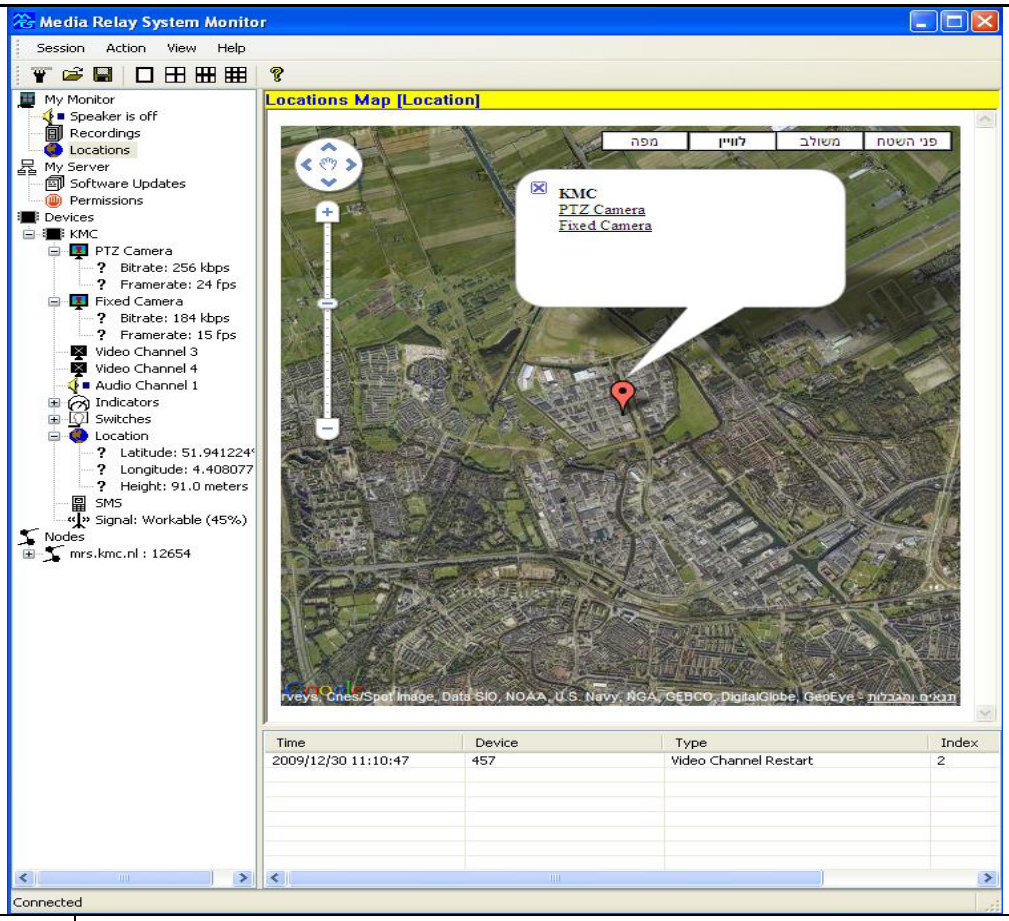
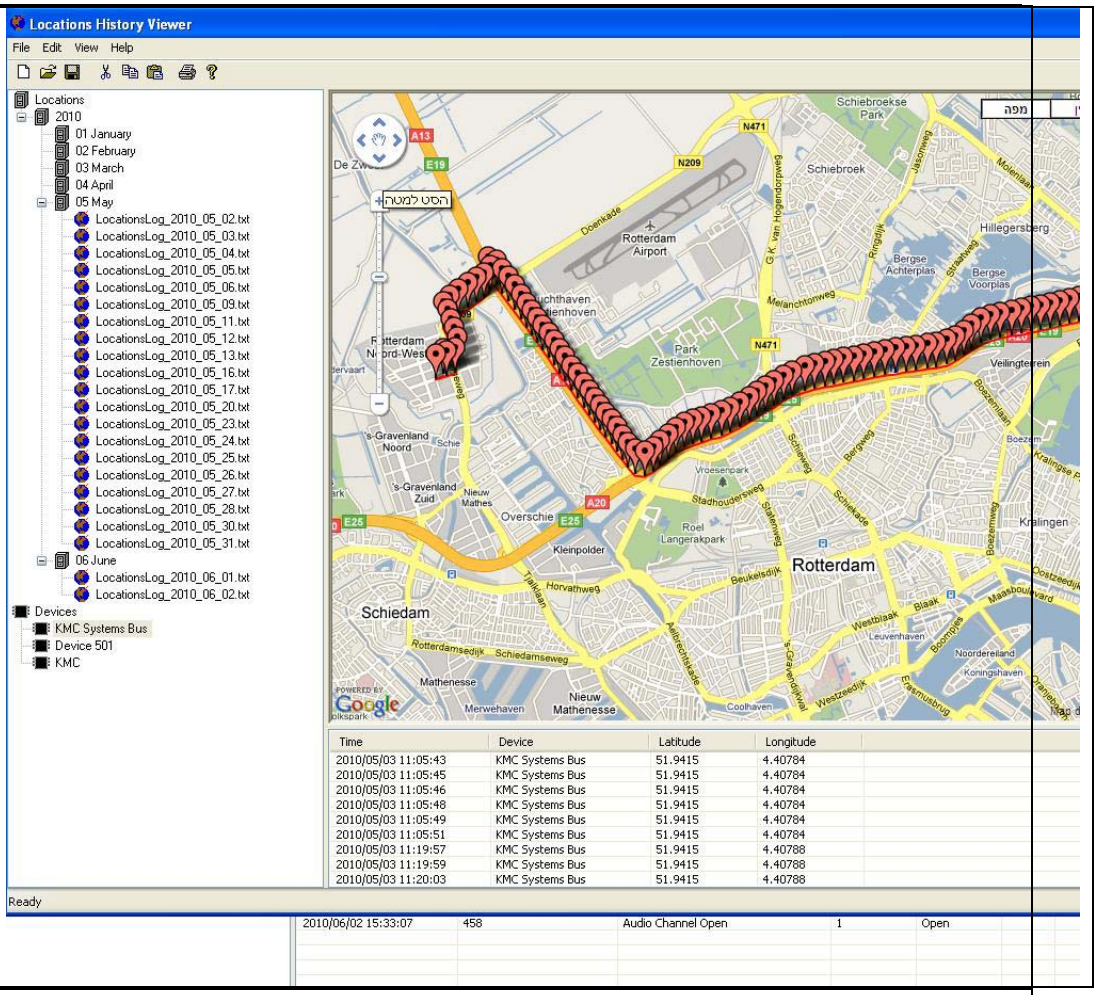


Figure 9 – MRS Monitor – Video over map

3.3.3 GPS Recording

GPS route is stored on any connected monitor. The route is stored per day and per device. You can view the route using "location view" under "view" menu



3.3.4 Audio-in

	Device level (under specific device tree), in this case the device icon is centered automatically every few seconds.

3.3.5 Audio-out

	Double clicking on the audio out channel opens the audio stream from the client to the device. (make sure the device has speaker unit attached to line out.)

3.3.6 Recording

	Recording can be done either inside the unit on a micro SD card and on each computer which the MRS monitor server or client is running. Use action menu for both options. Use the same option to finish recording. Viewing the recording can be done using the right

	recording layer in the tree (unit recording or client pc recording). The location in the PC and the file size can be configured by putting the cursor on the recordings and F3 function. (see below)
	Figure 10 – MRS Monitor – Local recording file system

3.3.6.1 Record Locally and Record on Device

	1	Select the channel that you want to record by clicking on the channel name.
	2	Click on Action Menu and enable the record by clicking on:
		"Record Locally" or "Record on Device" (you can choose both of them one by one)
		If you select record on device the unit will record the channel all the time even there is no connection with the server (bit rate of microSD is limited according to manufacture, You can test the speed on the device using the LCD for results

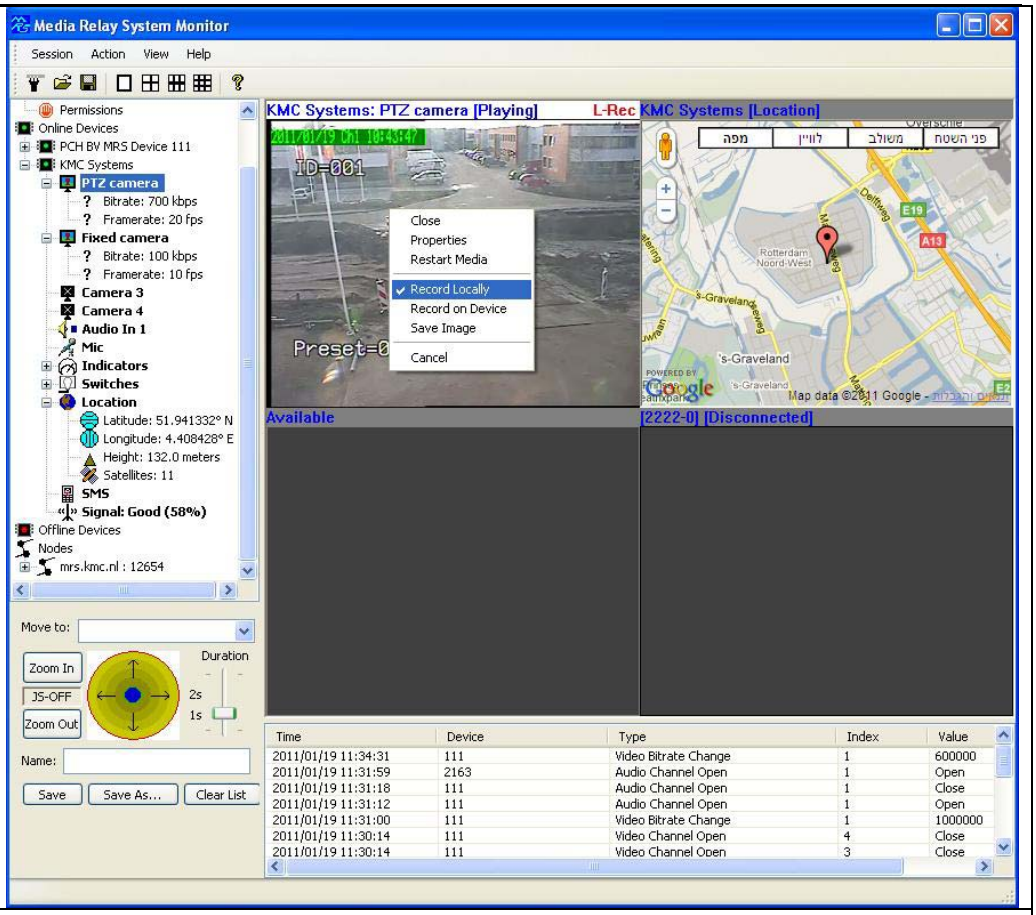


Figure 11 - MRS Monitor – enable channel for record

After you enable the record action you can see the sign beside the action, Record locally or Record on Device. It means that the Record Locally is enabling.

Audio can be recorded as well in separate files the same way video is recorded.

Synchronize video and audio can be recorded by attaching the audio to one of the video. Put the cursor on one of the video channels and attached the voice. The Recording video will have synchronized audio in the file.

3.3.6.2 Play local recording (video)

To view and play records locally open the Recordings tree, the files arranged by date tree. To play a record file choose the file by date, time, device- ID and channel name, double clicking on the file will play it.

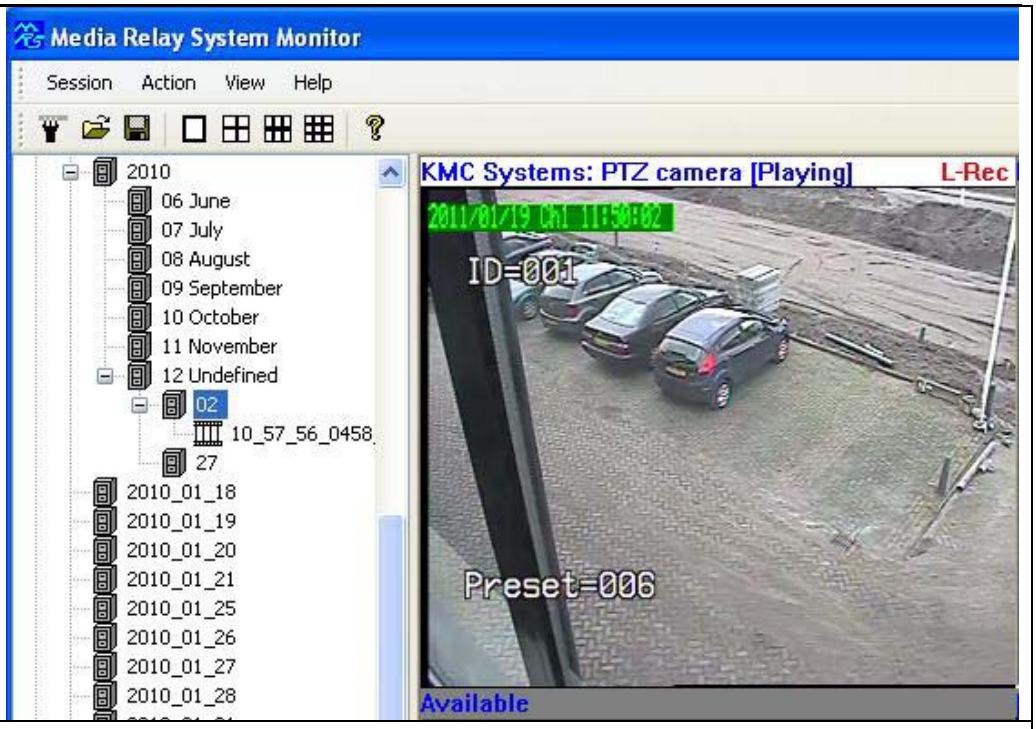


Figure 12 – MRS Monitor – Play Local Recording

3.3.6.3 Play local recording (audio)

To hear play records locally open the Recordings tree, the files arranged by date tree. Double click on audio file open audio player

3.3.6.4 Play the Device Record files.

To view the device record files, open the Recordings tree at the MRS Monitor devices tree, the files arranged by date/time tree.

To play the record file choose the file by date, time, device- ID and channel name, double clicking on the file will play it.

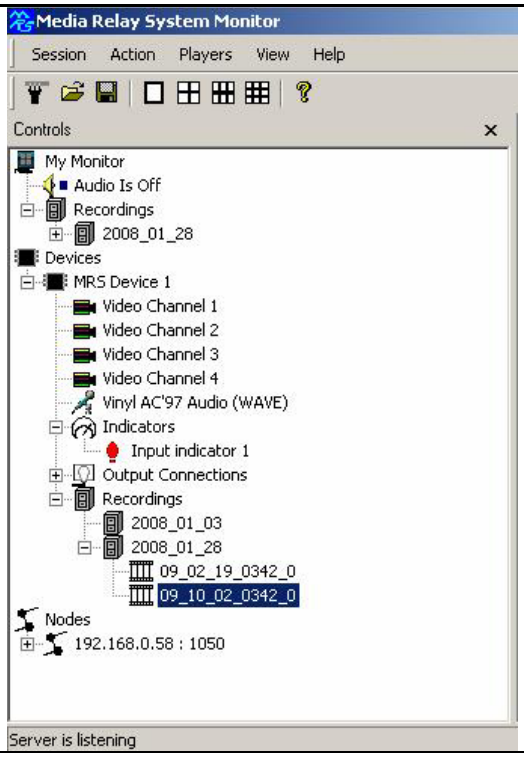


Figure 13 - MRS Monitor – Play Device Recordings files

3.3.7 VMD

The MRS unit supports VMD which can be defined per video channel
VMD trigger is used to alarm viewing clients and sending SMS (refer to SMS section)

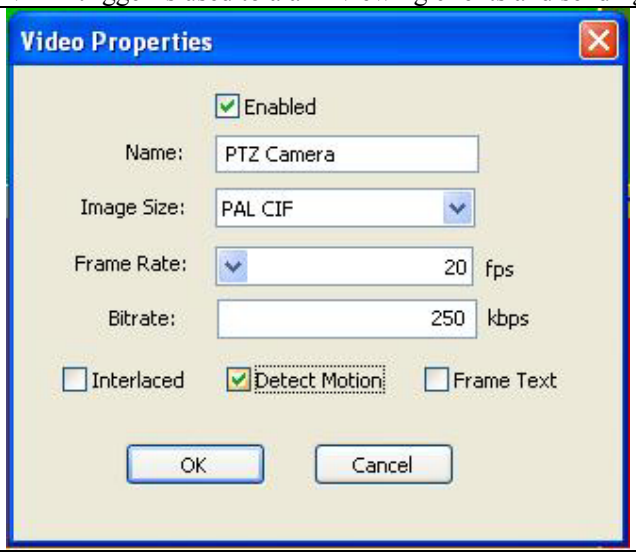


Figure 14 - MRS Monitor – VMD control On/Off

VMD can be setup to beep, open the specified channel and start recording

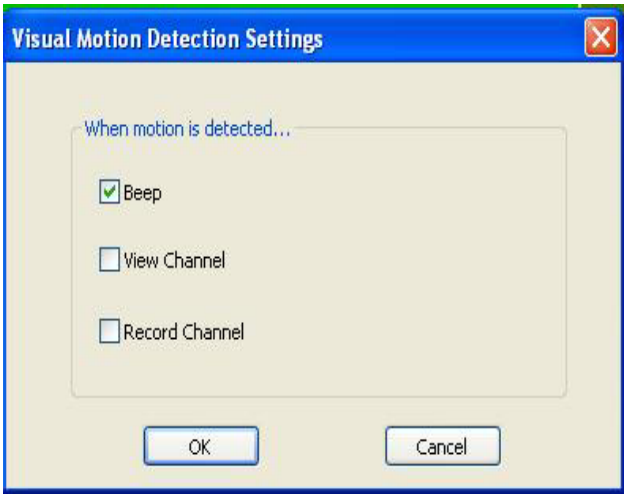


Figure 15 - MRS Monitor – VMD setup

3.3.8 SMS

The unit can send SMS to any number of phones as a result of VMD trigger or input (i/o). Messages can be written in any language. phone number and names must be field in the following window:

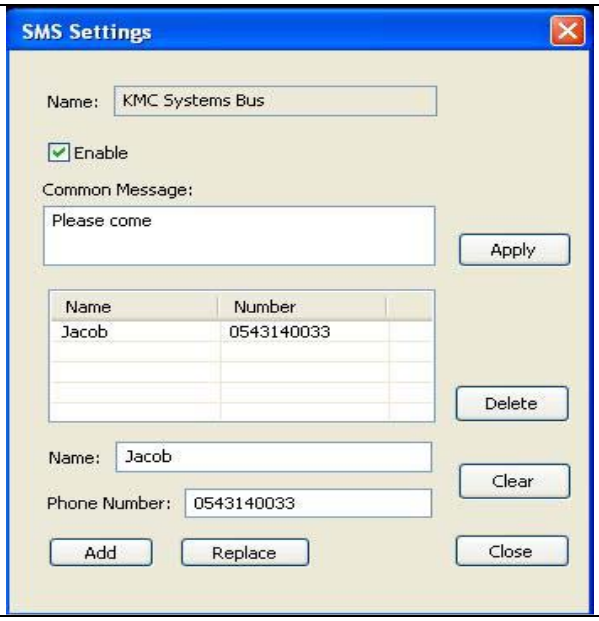


Figure 16 - MRS Monitor – SMS Setup

3.3.9 Voice

The MRS unit can stream audio by double clicking on the microphone button in the device. Double clicking again stops the streaming of the unit audio. The user can change the audio parameters by clicking on the audio button and pressing F3. the user can see the audio status at the MRS Monitor screen.

3.3.10 I/O

The MRS unit supports 4 input and 4 output signals (viewed in the tree). The signals are at TTL level. In order to trigger input signal you need to close between input 1-4 and GND

GPIO define as trigger for the following actions:

- Beep
- Sending SMS to any number of phones
- Start streaming on specific channel
- Start recording on specific channel

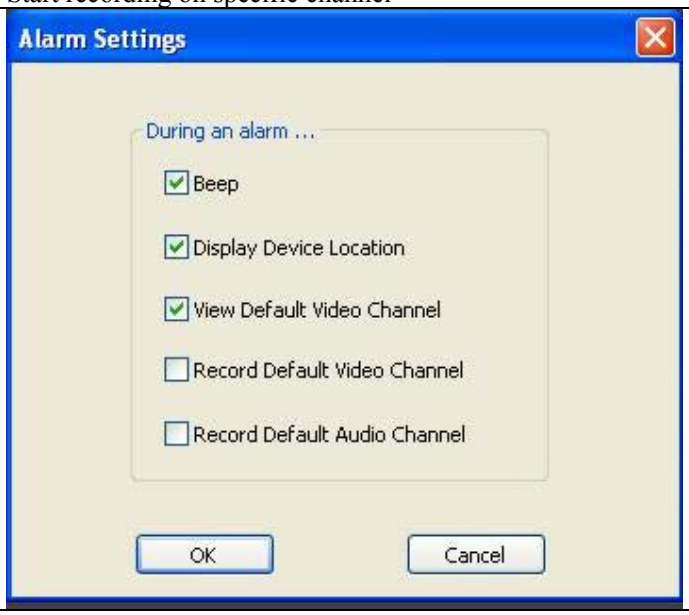


Figure 17 - MRS Monitor – I/O Alarm setup

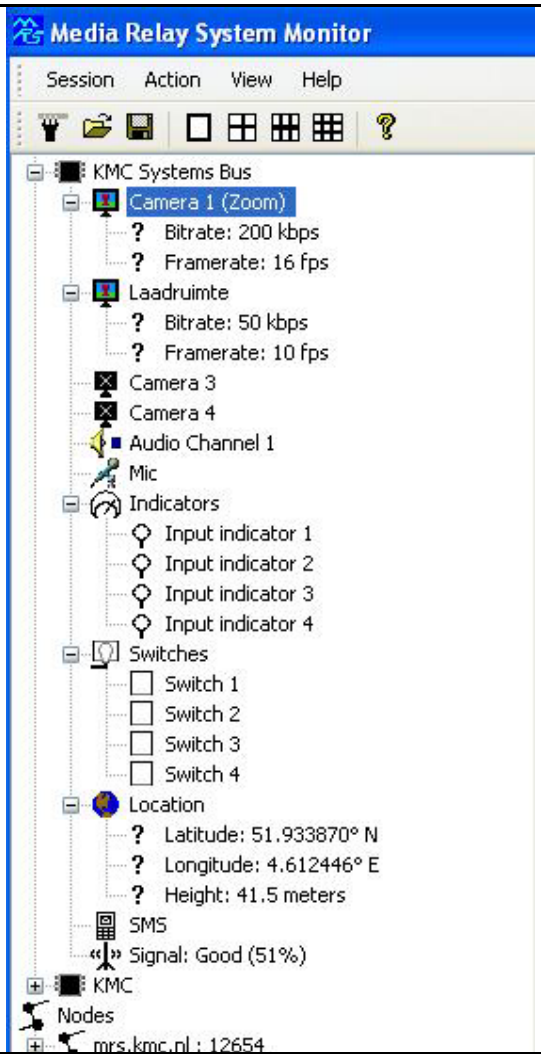


Figure 18 – MRS monitor – GPIO in/out status

3.3.11 PTZ

The MRS system can control PTZ camera. User can control the:
Pan/Tilt/Zoom and presets according to the PTZ camera ability.

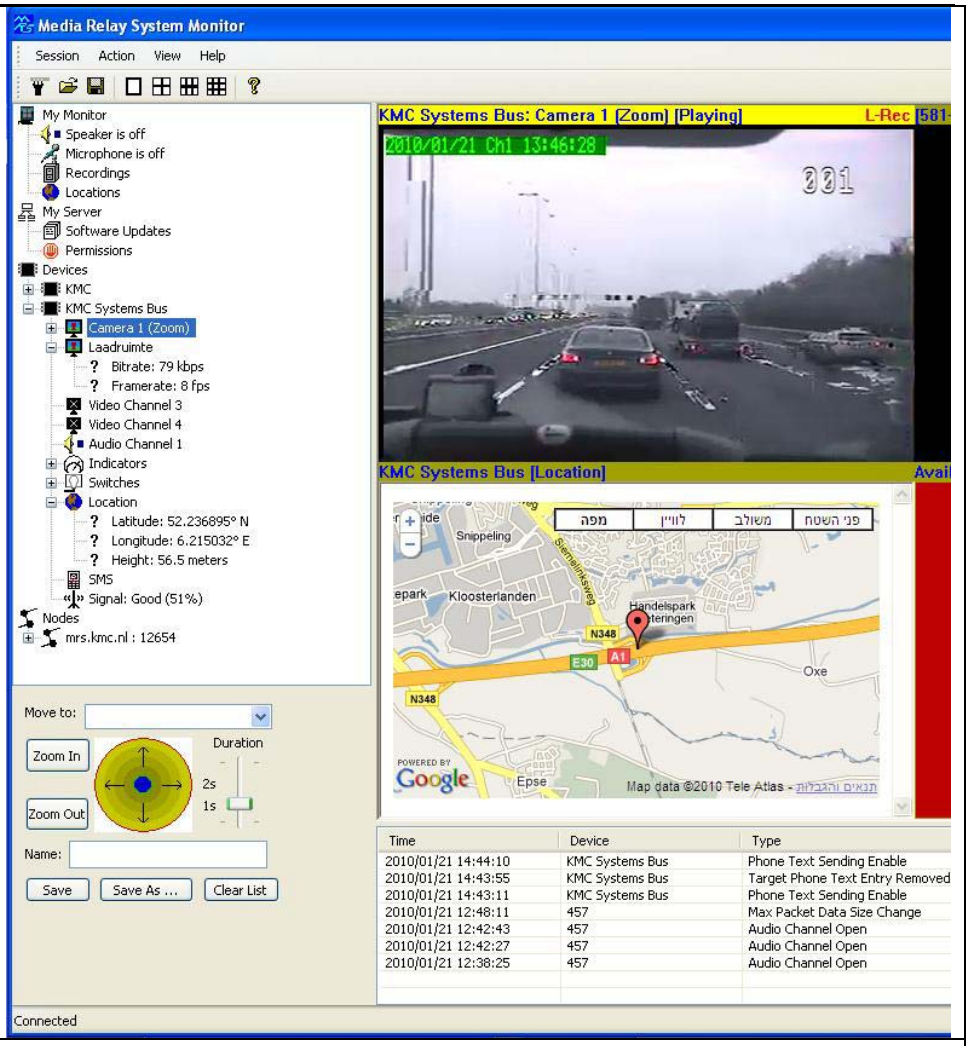


Figure 19 – MRS Monitor – PTZ Control

The user can define a set of presets by adjusting the camera to the object and save it by name. To apply the preset choose the preset name from the list box "move to", then the camera will focused to the choosing object. The duration scale is to simulate the time of one click. By moving the duration up/down will long/short the PTZ duration command accordingly.

The MRS supports channel 1 camera with PELCO D protocol.

3.4 Authentication

In general each device and user can be defined with password for authentication in the server.

Permission is defined by the server software only (permission icon) for users, devices and the connection between users and devices.

Figure 20 – MRS Monitor - Authentication Server setup

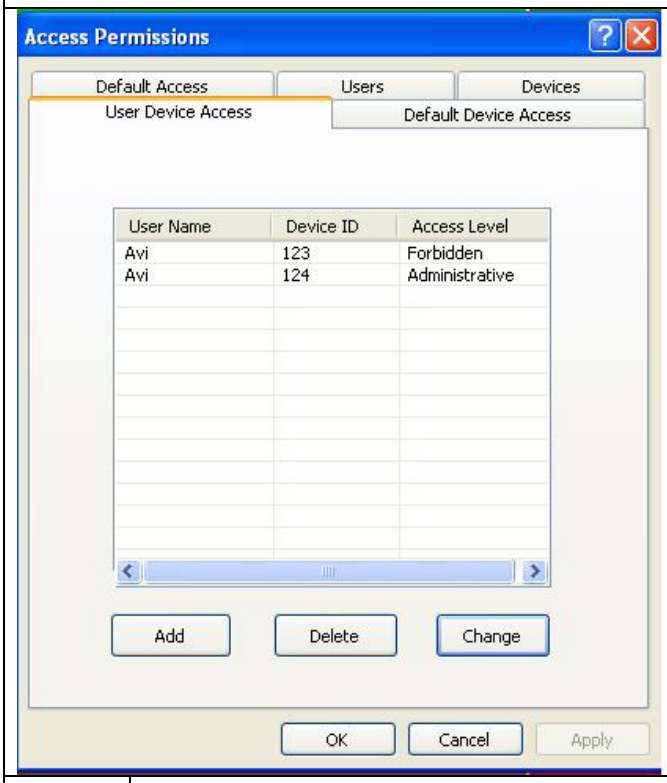
3.4.1 Users

Each user can be defined in the server with password (the password is for authentication only)

3.4.2 Devices

Each device can be defined in the server with password (the password is for authentication only)

3.4.3 Permission level (user device access)



Each user can be defined with permission access for specific device:
Forbidden- no access
Aware- view connection only
Passive- View video without capability of change (bit rate/Frame rate)
Active – View and change bit rate / Frame rate
Admin- Control any parameter

3.4.4 Default Access

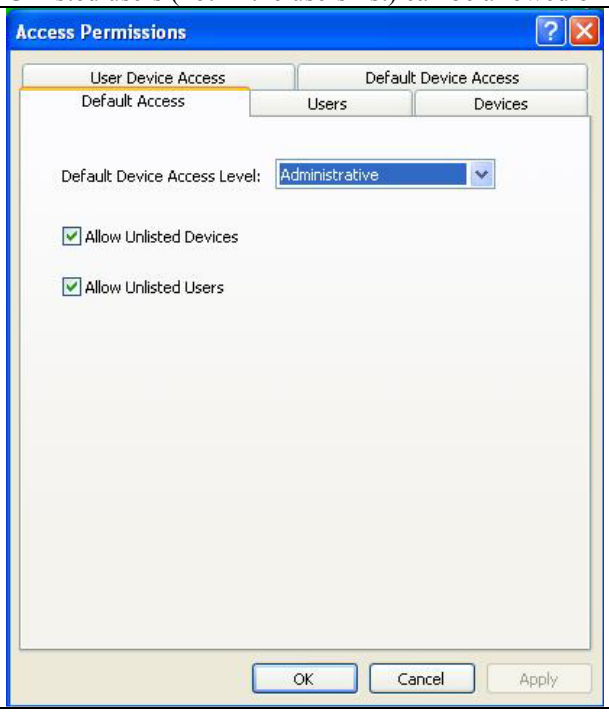
	The “default device access” screen defines the access level of each device which is **not** specified in “user device access”. The “default access” screen defines the user access level of all other devices (not specified devices either in “user device access” or “default device access”) Unlisted devices (not in the devices list) can be allowed or not allowed in the system. Unlisted users (not in the users list) can be allowed or not allowed in the system.
	

Figure 21 – MRS Monitor - Permission setup

3.5 Session

Session is set of parameters which defines the current definition of the MRS monitor application. Session includes open channels and channel parameters. Session can be saved to a file and reload anytime.
User can enable the “automatic” button which will save the current setting in the last session when exiting the program. After restarting, the program will load last updated session which was saved automatically when exit.

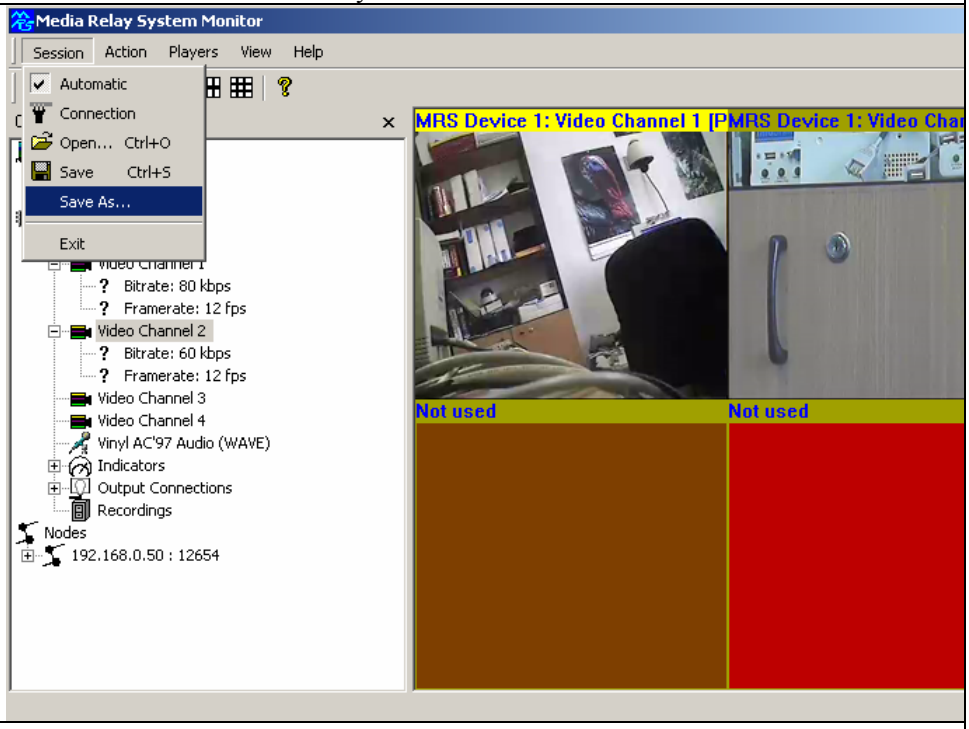


Figure 22 – MRS Monitor – session options

3.6 Nodes

The user can view all connected devices and clients using the Nodes list.

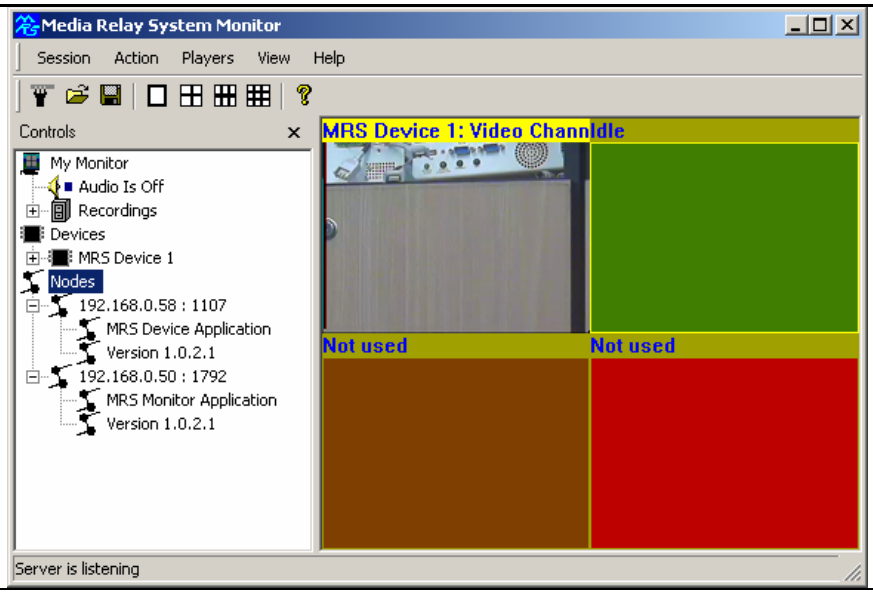


Figure 23 – MRS Monitor - Nodes

3.7 IPHONE/PDA

MRS support Iphone client for live video monitoring. Download iMRS app from apple appstore

3.8 Web Internet Flash Client

The monitor server support flash client in any web browser by using server IP address as follows" **http://"server ip address":12654/videostreams.html**

If video and voice is needed (synchronized) you need to attached the voice to one of the video channel Put the cursor on the video channel and right click on the mouse for attached audio channel.